Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A reactor vessel comprising:

a catalyst nozzle for delivering catalyst to said reactor vessel;

a feed nozzle for delivering feed to said reactor vessel, said feed nozzle joining said catalyst nozzle at a joint proximate to a work point at which said catalyst contacts said feed to convert said feed to yield product vapor;

a disengaging region above and below said work point;

a transport conduit having an inlet for receiving said product vapor and entrained catalyst and an outlet, said inlet being disposed in said disengaging region vertically higher than said joint between said feed nozzle and said catalyst nozzle; and

a cyclone having an inlet directly communicating with said outlet of said transport conduit, said cyclone communicating with a vapor outlet extending from said vessel and a dipleg extending downwardly from said cyclone for transporting catalyst toward a base of said reactor vessel.

Claim 2 (original): The reactor vessel of claim 1 further comprising a stripping section at the base of reactor vessel for stripping product vapors from said catalyst.

Claim 3 (original): The reactor vessel of claim 2 wherein said stripping section includes a series of trays and stripping medium is injected into said stripping section.

Claim 4 (original): The reactor vessel of claim 1 wherein said catalyst nozzle includes a slot for generating a curtain of catalyst.

Claim 5 (original): The reactor vessel of claim 4 wherein said feed nozzle includes a feed contactor for injecting feed into said curtain of catalyst.

Claim 6 (original): The reactor vessel of claim 4 wherein said catalyst nozzle includes a funnel section that dispenses through said slot.

Claim 7 (original): The reactor vessel of claim 1 wherein said inlet faces away from said work point.

Claim 8 (currently amended): A catalytic cracking reactor vessel comprising:

a catalyst nozzle for delivering catalyst to said reactor vessel;

a feed nozzle for delivering feed to said reactor vessel, said feed nozzle joining said catalyst nozzle at a joint proximate to a work point at which said catalyst contacts said feed to crack said feed to yield product vapor;

a disengaging region above and below said work point;

a transport conduit having an inlet facing away from the work point, said inlet for receiving said product vapor and entrained catalyst, and an outlet, said inlet being disposed in said disengaging region vertically higher than said joint between said feed nozzle and said catalyst nozzle; and

a cyclone in said reactor vessel, said cyclone having an inlet directly communicating with said outlet of said transport conduit, said cyclone communicating with a vapor outlet extending from said vessel and a dipleg extending downwardly from said cyclone for transporting catalyst toward a base of said reactor vessel.

Claim 9 (original): The reactor vessel of claim 8 further comprising a stripping section at the base of reactor vessel for stripping product vapors from said catalyst.

Claim 10 (original): The reactor vessel of claim 9 wherein said stripping section includes a series of trays and stripping medium is injected into said stripping section.

Claim 11 (original): The reactor vessel of claim 8 wherein said catalyst nozzle includes a slot for generating a curtain of catalyst.

Claim 12 (original): The reactor vessel of claim 11 wherein said feed nozzle includes a feed contactor for injecting feed into said curtain of catalyst.

Claim 13 (original): The reactor vessel of claim 11 wherein said catalyst nozzle further includes a funnel section that dispenses through said slot.

Claim 14 (original): The reactor vessel of claim 8 including a heat nozzle for delivering catalyst to said stripping section.

Claim 15 (currently amended): A process for cracking a heavy hydrocarbon feed to a light hydrocarbon product comprising:

delivering catalyst to a reactor vessel through a catalyst nozzle;

delivering heavy hydrocarbon feed to said reactor vessel through a feed nozzle, said feed nozzle joining said catalyst nozzle at a joint;

contacting said catalyst and said heavy hydrocarbon feed at a work point proximate to said joint to convert said heavy hydrocarbon feed to light hydrocarbon product vapor;

discharging said catalyst and hydrocarbon product vapor horizontally into a disengaging region;

withdrawing said product vapor and entrained catalyst through an inlet in a transport conduit, said inlet being disposed in said disengaging region vertically higher than said joint between said feed nozzle and said catalyst nozzle;

transporting said light hydrocarbon product vapor from said inlet through an outlet in said transport conduit directly to a cyclone; and

separating said entrained catalyst from said light hydrocarbon product vapor in said cyclone.

Claim 16 (original): The process of claim 15 further comprising expelling said catalyst from a dipleg of said cyclone.

Claim 17 (original): The process of claim 16 further comprising stripping said catalyst expelled from said dipleg of entrained hydrocarbons.

Claim 18 (original): The process of claim 15 further comprising expelling said lighter hydrocarbon product vapor from an outlet of said cyclone.

Claim 19 (original): The process of claim 15 further comprising generating a curtain of catalyst before said catalyst is contacted with said heavy hydrocarbon feed.